Amendment to the Claims:

The listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1-10. Cancelled.

11. (Currently Amended) A method of active seismic monitoring of an underground formation providing separation of induced microseismicity signals from seismic signals emitted ~~within a context of~~ during active seismic monitoring of an underground zone under development, the induced microseismicity signals and the seismic signals being obtained only during the active seismic monitoring, comprising carrying out seismic recording cycles with emission of seismic waves in the formation by coupling therewith at least one seismic source, which emits simultaneously orthogonal signals so as to form a composite vibrational signal, receiving signals reflected by the formation in response to the emission of seismic waves, recording the signals received by at least one seismic pickup and processing the recorded signals to separate respective contributions of each seismic source to the received signals and to reconstruct seismograms equivalent to seismograms that would be obtained by separately actuating each seismic source, separating the induced microseismicity signals in the records from seismic signals resulting from active monitoring operations, by isolating a contribution thereof by comparison with a ~~reference~~ current spectral model, the ~~reference spectral model accounting for spectral contributions of each seismic source at emitted fundamental frequencies and at respective harmonics thereof~~ current spectral model being

formed by updating a previous spectral model using a weighted average of current and previous contributions of each seismic source, and by reconstructing the microseismicity signals by inversion in the time domain.

12. (Previously Presented) A method as claimed in claim 11, wherein a spectral contribution of the microseismicity signals to a spectrum of the received signals received is obtained by subtracting amplitude and phase values associated with the reference spectral model from amplitude and phase values of a spectrum associated with the records.

13. (Previously Presented) A method as claimed in claim 11, wherein the reference spectral model is a current spectral model formed by updating a previous spectral model by accounting for a spectral contribution of previous recording cycles.

14. (Previously Presented) A method as claimed in claim 11, wherein a current spectral model is formed by determining a mean value of a frequency spectra formed from earlier and/or later records obtained for a same source and frequencies which are the same.

15. (Previously Presented) A method as claimed in claim 11, wherein a current spectral model is formed by determining a median value of a frequency spectra formed from earlier records obtained for a same source and frequencies which are the same.

16. (Previously Presented) A method as claimed in claim 11, wherein a current spectral model is formed by extrapolation or interpolation from a frequency spectrum from spectral values.

17. (Currently Amended) A method of active seismic monitoring of an underground formation including discrimination of induced microseismicity signals from among signals emitted ~~within a context of~~ during active seismic monitoring of an underground zone under development, the induced microseismicity signals and the seismic signals being obtained only during the active seismic monitoring, comprising carrying out seismic recording cycles with emission of seismic waves in a formation by coupling therewith at least one seismic sources which emits simultaneously orthogonal signals so as to form a composite vibrational signal, receiving signals reflected by the formation in response to emission of seismic waves, recording the signals received by a seismic receiver ~~means~~ and processing the recorded signals so as to separate respective contributions of the seismic sources to the received signals and to reconstruct seismograms equivalent to seismograms that would be obtained by separately actuating the seismic sources by separately actuating each seismic source, separating the induced microseismicity signals in the records from seismic signals resulting from active monitoring operations, by isolating a contribution thereof by comparison with a ~~reference spectral~~ current spectral model, the current spectral model being formed by updating previous spectral model using a weighted average of current and previous contributions of each seismic source~~model~~, the reference spectral model accounting for spectral contributions of each seismic source at emitted fundamental

frequencies and at respective harmonics thereof, and by reconstructing the microseismicity signals by inversion in the time domain, comprising:

a) calculating for each recording n of a recording cycle p, respective contributions ($C_{p,i,n}$) of the seismic sources at the fundamental frequencies;

b) calculating a ratio ($E_{p,n}$) of a contribution to a current spectral model ($M_{p,n}$) formed by updating a previous spectral model ($M_{p,n-1}$) from frequencies emitted during a previous recording (n-1) and from harmonics thereof;

c) deducing a part ($A_{p,n}$) of the recording n of cycle p that can be associated with active seismic monitoring operations;

d) deducing a part ($P_{p,n}$) of the recording n of cycle p related to passive microseismic activity;

e) forming by inversion the seismograms that can be associated with active seismic monitoring operations by inversion in a time domain of the respective spectral contributions ($C_{p,i,n}$) of each seismic source at fundamental frequencies and at harmonics thereof, after completion of a measuring cycle; and

f) forming underlying microseismic signals contained in the records by inversion in a time domain from a part ($P_{p,n}$) related to passive microseismic activity.

18. (Previously Presented) A method as claimed in claim 17, wherein the respective contributions ($C_{p,i,n}$) are obtained by multiplying a transfer function ($T_{p,i,n,r}$) between a wavelet characteristic of each seismic source and a seismogram associated with a receiver, by a wavelet characteristic of each seismic source.

19. (Previously Presented) A method as claimed in claim 18, wherein the transfer function is continuously updated.

20. (Previously Presented) A method as claimed in claim 19, wherein updating of the transfer function ($T_{p,i,n,r}$) is obtained during a current cycle from an estimation ($T_{p,i,n-1,r}$) made during a previous cycle and from an initial estimation ($To_{p,I,n,r}$) ($To_{p,i,n,r}$) made during a current cycle by the relation :

$$T_{p,i,n,r} = (1 - h)T_{p,i,n-1,r} + hTo_{p,i,n,r}.$$; and wherein

h is an updating coefficient of the spectral models.